RESTRICTED CIRCULATION

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Agricultural Memorandum No. 672

Comparison of Beaumont and 90% R.H. criteria in relation to Potato Blight outbreaks

L P Smith and J M Seager

Since 1950, forecasting the outbreak date of potato blight has been done by the Plant Path. Lab. using Beaumont periods supplied by the Met. Office. In Plant Pathology Vol.5,No.3 (September 1956) it was stated that periods based on relative humidity values of 90% or over gave a better forecast than the Beaumont periods in critical years. At the time the processes of communication did not permit the use of these 90% periods. It now seems likely that daily information about these high humidities can be obtained. Records for 12 stations, Leeming, Waddington, Mildenhall/Honington, Manston, Thorney Island, Boscombe Down, Elmdon, Ringway, Valley, Aberporth, Cardiff and Plymouth for the 7 years 1966-1972 were examined. The criteria used in defining the periods were as follows.

Beaumont Period

A period of 48 hours during which the dry bulb temperature in the screen has been 10°C or above and the relative humidity in the screen has been 75 per cent or above on at least 46 out of 48 hourly observations.

90% criteria (a)

The day is taken from 1300 hrs to 1200 hrs. A critical period is two consecutive days when the minimum temperature is 10°C or above and on each day there are at least 11 hours when the relative humidity is 90% or more. A near miss occurs when one or both of such days has only 10 hours of high relative humidity. The date quoted refers to the day on which the 1300-1200 period ends.

90% criteria (b)

The day is from 0001 hrs to 2300 hrs and the critical period is defined as in (a). The minimum temperature is judged only on the 0900h value.

The full details of the periodsare given in the appendix. Dates in brackets indicate near misses and underlined dates appear to be the significant weather periods preceding the blight outbreaks. Cases where outbreak dates were unknown are indicated by a question mark.

Comparison

Beaumont and 90% criteria (a) [1300-1200]

Significant period given by:-	No. of times
Both	41
Beaumont only	3
90% criteria (a) only	22

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90% criteria (a) [1300-1200] and (b) [0001-2300]

Significant period given by:-	No. of times
Both	48
(a) only	15
(b) only	1

These comparisons seem to indicate that the 90% criteria (a) [1300-1200] provide the best significant periods. Further work is being done in regard to carry over of infection from the previous year and the significance of critical weather periods occurring prior to the one preceding the outbreak.

Any comments or suggestions on this paper should be referred to the author.

Meteorological Office
Bracknell

September 1974

APPENDIX

LEEMING

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	9-12	-	2-4 11-13, 28-30	
90% 13-12	10-13, 16-18	-	(7-8), 12-14	
90% 0-23	10-13, 16-17	-	12-13, (21-22)	Aug. 11
1967				
Beaumont	-	13-17	8-11, 26-29	
90% 13-12	-	15-16	9-11, 23-24	
90% 0-23	-	14-15	9-10, 22-23, 27-28	Aug. 10
1968				
Beaumont	-	30-3, 13-18, 19-22	12-15, 23-30	
90%, 13-12	-	1-2, 8-9, 14-15	3-6, 13-14, 24-25 27-29	
90% 0-23	-	1-2, (14-15) (20-21)	4-6, 13-14, 24-29	Aug. 16
1969				
Beaumont		30-2	1-4, 13-17	
90%, 13-12	-	(28-29)	2-4, 12-17	
90%, 0-23	-	-	1-3, 11-16	Aug. 1
1970				
Beaumont	-	25-28	19-23	
90%, 13-12	7-9	(24-25)	3-5, (7-8), 20-24	
90%, 0-23	7-9	26-27	3-4, 20-24	Aug. 10
1971				
Beaumont	-	8-11, 21-25, 26-29	12-15, 20-25	
90%, 13-12	19-20	23-29	4-5, 13-15, 22-24	
90%, 0-23	(19-20)	23-28	12-14, 21-24	Aug. 5
1972				
Beaumont	24-26	20-24 29-3	25-28	
90%, 13-12	-	18-20, 22-25	1-2	
90%, 0-23	-	18-24 30-2		Aug. 15

WADDINGTON

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	10-11	18-20	10-12 28-1	
90%, 13-12	10-13,17-18,26-27		31-1,7-8,12-13,21-22 28-30	July 12 &
90%, 0-23	10-12, (20-21)		30-1,12-13,21-22,28-30	Aug 15
1967				
Beaumont	-	12-15	10-13	
90%, 13-12	24-26	13-16	9-12, 23-24	
90%, 0-23	24-25	13-15	9-12, 23-24	Aug 16
1968				
Beaumont	27-30	12-18	6-9,19-21,26-30	
90%, 13-12	11-12,15-17, (29-30)	8-10,14-17,23-24	1-4,9-10,27-29	
90%, 0-23	15-17,28-29	8-10, 14-16	4-6,7-10,23-24, 26-29	July 15 & July 26
1969				
Beaumont	-	27-30 31-4	29-3	
90%, 13-12	-	24-29	1-3,(7-9),13-16	
90%, 0-23	-	23-26, 28-29	1-3,8-9,12-15, 18-19,30-31	Aug 12
1970				
Beaumont	-	25-28	5-8, 22-24	
90%, 13-12	-	24-25, 27-28	6-8,20-24,27-28	
90%, 0-23	-	-	5-7,19-24,27-28	Aug 15
1971				
Beaumont	18-20	8-11	19-25	
90%, 13-12	19-20	3-7,10-11,27-30	10-11,13-15,19-24	
90%, 0-23	19-20	2-6,8-10,27-29	(10-13), 19-24	Aug 11
1972				
Beaumont	-	6-9, 20-26 31-3		
90%, 13-12	-	8-9, 18-25 31-2, 30-31		
90%, 0-23	-	(7-8),(16-17), 18-25 31-1	30-1	Aug 8

MILDENHALL (HONINGTON)

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	-	7-9, 18-20	28-30	
90%, 13-12	-	8-9, 19-21, (29-1)	28-31	
90%, 0-23	(20-21)	(3-4), 8-9, 19-20 29-1	27-31	July 29
1967				
Beaumont	-	-	-	
90%, 13-12	-	-	2-3, 23-25	
90%, 0-23	-	-	23-25	Aug 10
1968				
Beaumont	-	16-18 31-10	27-30	
90%, 13-12	4-5, 15-16, (28-29)	9-11, 14-15	1-11, 16-17, 21-25 27-29	
90%, 0-23	-	(8-9), 10-11, 14-15 (17-18), 31-10, 16-17, 21-22,	26-29	July 14
1969				
Beaumont	22-25	10-12	28-31	
90%, 13-12	-	29-30	2-3, 15-17, 19-20 30-31	
90%, 0-23	-	-	(2-3), 15-16, (18-19), 30-31	Aug 13
1970				
Beaumont	-	-	18-22	
90%, 13-12	-	-	7-8, 20-22	
90%, 0-23	-	(26-28)	(3-4), 7-8, 20-22	Aug 29
1971				
Beaumont	-	-	19-24	
90%, 13-12	19-20	2-4, (22-24), 28-29	4-6, 13-15, 19-24	
90%, 0-23	19-20	3-6, 27-29	11-15, 19-24	Aug 17
1972				
Beaumont	-	20-23	-	
90%, 13-12	-	8-9, 20-25, 29-30	1-2, 30-31	
90%, 0-23	-	19-22, 24-25, 28-2, 29-31		Aug 16

MANSTON

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	-	17-22	20-22	
90%, 13-12	-	19-22	21-22	
90%, 0-23	11-12, 16-17	19-22	20-22	July 26
1967				
Beaumont	22-25	-	13-16,22-26	
90%, 13-12	24-25	28-31	2-3,(9-11),23-28	
90%, 0-23	23-25	28-30	(8-9),(14-15), 23-28	July 16
1968				
Beaumont	15-20, 26-29	16-19,21-24	29-11 24-30	
90%, 13-12	18-19,(22-23), 25-29	8-11,17-18	31-1,3-10,16-17,22-24, 28-30	
90%, 0-23	4-5,16-18,25-28	6-7,(9-10), (12-13),	31-1,3-10,15-17,21-24, 26-29	July 8
1969				
Beaumont	22-25	10-13	30-3 28-31	
90%, 13-12	31-1,23-24	(21-22)	1-3,13-16	
90%, 0-23	31-1,23-24	21-22	1-2,13-15	July 25
1970				
Beaumont	-	26-29	4-7, 22-25	
90%, 13-12	(10-11)	(5-6),(24-25)	2-4,6-10,	
90%, 0-23	-	(29-30)	1-3,5-6,8-10,20-21	Aug 15
1971				
Beaumont	1-11,18-21	26-30	8-11,19-24	
90%, 13-12	9-11,19-20	2-4,6-8,24-29	10-11,13-14,20-24	
90%, 0-23	9-10, (19-20)	2-3,(6-7),24-29	(4-5),9-10,13-14, 19-23	Aug 5
1972				
Beaumont	-	7-10,15-25	31-3	
90% 13-12	-	8-9, 18-25	1-2, 13-14	
90% 0-23	-	(3-5), 8-9, 18-24	30-2, 13-14	July 25

THORNEY

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	12-14,16-20	17-19	8-13	
90%, 13-12	(26-27)	6-7	10-13,29-30	July 1 &
90%, 0-23	-	5-6,(19-20)	6-7,11-13	July 28
1967				
Beaumont	2-6	21-2, 15-17	29-3,7-11,14-16,17-20, 23-29	
90%, 13-12	(4-6),21-25, (29-30)	(16-17),27-28	30-2,(9-10),19-20, 24-29	July 12 &
90%, 0-23	5-6,22-25	(27-28),30-31	19-20,23-28	Aug 15
1968				
Beaumont	15-18,24-30	6-11	30-13,20-22,27-30	
90%, 13-12	22-23,25-30	8-9,11-12	31-1, 7-13,21-22	
90%, 0-23	24-29	7-12, (20-21)	31-1, 7-12,21-22	July 15
1969				
Beaumont	-	27-30	31-3	
90%, 13-12	-	21-22,29-30	1-2,15-16	
90%, 0-23	-	(21-22)	1-2, 14-15	Aug 1
1970				
Beaumont	10-13	3-7,17-20,25-29	4-7,11-13,18-23	
90%, 13-12	11-13,24-25	5-6,27-29	6-7,19-23,26-27	
90%, 0-23	11-12	5-6,(8-9),18-19 26-28	6-8,(12-13),19-23, 25-26	Aug 15
1971				
Beaumont	30-4,	23-30	2-7,8-14,18-23, 27-30	
90%,13-12	-	(2-3),(27-28)	20-22	
90%, 0-23	-	1-2,(24-25),27-28	20-21,(22-24)	Aug 13
1972				
Beaumont	16-19,25-28	3-6,19-24,28-31	21-24	
90%, 13-12	-	3-5,8-9,20-22	1-2	
90%, 0-23	-	2-4, 20-21	30-1, 6-7,23-24	July 26

BOSCOMBE

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	-	18-20	10-12	
90%, 13-12	(7-8),(13-14),(22-23)	5-6	3-4,10-13,29-31	
90%, 0-23	(12-13),(22-23),(25-26)	-	(3-4),11-13,(20-21)29-31	July 15
1967				
Beaumont	21-26	28-31	13-16	
90%, 13-12	23-25	19-20,25-28,	30-2, 10-11,14-16,18-20,24-26	
90%, 0-23	22-25	18-19,25-27,	29-2,9-11,14-15,18-19,23-25	Aug 15
1968				
Beaumont	26-29	-	2-5,6-11,27-30	
90%, 13-12	22-23,25-29	8-11	7-10,16-17,21-22	
90%, 0-23	25-29	7-10,(13-14)	6-10, 20-22	July 22
1969				
Beaumont	-	-	11-14	
90%, 13-12	-	-	12-14,(16-17),19-20	
90%, 0-23	16-17	(21-23),(27-29)	11-13,16-20	?
1970				
Beaumont	-	26-29	18-22	
90%, 13-12	12-13,23-25	5-6,8-9,18-19,(23-24),27-29	7-8,12-13,19-23	
90%, 0-23	(11-12),23-24	4-5,8-9,(18-19),23-24,27-28	6-8,12-13,19-22	Aug 19
1971				
Beaumont	-	-	-	
90%, 13-12	19-20	30-4, 23-28	1-2,9-10,12-15,19-22	
90%, 0-23	19-20	30-4, 23-27	(3-6),9-10,12-15,21-22	Sept 1?
1972				
Beaumont	23-28	2-5, 18-22	-	
90%, 13-12	25-26	3-4,8-9,19-25	30-2,5-8	
90%, 0-23	24-26	3-4,8-9,19-25	30-1,5-7	July 28

ELMDON

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	9-11	-	10-12 31-2	
90%, 13-12	10-12	-	12-13	
90%, 0-23	10-12	-	29-30	July 5 & July 30
1967				
Beaumont	21-27	-	17-20	
90%, 13-12	24-26	-	(10-11), 24-25	July 14 &
90%, 0-23	23-26	(13-14)	(10-11), (23-24)	Aug 16
1968				
Beaumont	-	-	5-10, 27-30	
90%, 13-12	(15-16)	(8-9)	-	
90%, 0-23	-	-	-	?
1969				
Beaumont	-	-	11-14, 29-31	
90%, 13-12	-	28-29	2-3, 10-14	
90%, 0-23	-	28-29	1-3 9-13	Aug 12
1970				
Beaumont	-	-	18-21	
90%, 13-12	-	(27-28)	(3-4), 6-8, 20-21 23-24	
90%, 0-23	-	-	(3-4), 6-7, 19-24	Aug 4
1971				
Beaumont	-	-	11-15, 21-23	
90%, 13-12	19-20	(1-3), 4-5, 10-11, (23-24)	2-5, 10-11, 13-14, 22-24	July 14 &
90%, 0-23	-	(1-2)	2-4, 12-14, 22-24	July 28
1972				
Beaumont	23-28	6-9, 20-23 30-2		
90%, 13-12	-	19-23	1-2	
90%, 0-23	26-27	(19-20), 21-23 30-1	31-2	?

RINGWAY

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	-	-	10-13	
90%. 13-12	-	7-8	12-13,(19-20)	
90%, 0-23	-	-	12-13	July 17
1967				
Beaumont	-	-	-	
90%, 13-12	25-26	-	10-13,(18-19),28-29	
90%, 0-23	-	-	11-13	Aug 13
1968				
Beaumont		30-3,12-15	-	
90%, 13-12	-	(1-2),(8-9),20-21	-	
90%, 0-23	-	1-2	-	Aug 26
1969				
Beaumont	-	9-13	1-4 Sept.10-17	
90%, 13-12	-	(12-13)	2-3,(14-16),Sept 3-6 11-12	
90%, 0-23	-	28-29	2-3,Sept (3-6) (11-12)	Sept 16
1970				
Beaumont	-	25-28	-	
90%, 13-12	28-29	27-28	7-8,21-22	
90%, 0-23	27-29	27-28	20-21	Aug 13
1971				
Beaumont	-	-	12-15	
90%, 13-12	19-20	-	13-14	
90%, 0-23	(19-20)	-	(13-14),(23-24)	Aug 13
1972				
Beaumont	24-27	21-24	-	
90%, 13-12	-	22-24	-	
90%, 0-23	-	22-24	-	Aug 15

VALLEY

	JUNE	JULY	AUGUST	OUTBREAK
1966				
Beaumont	2-7,12-26	29-2, 14-15,27-30	8-13,15-19 29-31	
90%, 13-12	3-7,9-10,14-15, 18-19,21-23	1-3,5-6,8-11,15-17 23-24	11-13,17-21,30-31	
90%, 0-23	4-7,12-14,19-22	1-2,(8-10),15-17 (23-24)	11-13,17-21,30-31	July 8
1967				
Beaumont	2-7,26-30	3-7	23-1,10-20,22-29	
90%, 13-12	3-6,25-26,28-29	(4-5)15-16,18-19, 25-27,30-1,18-19,23-25,27-29		
90%, 0-23	3-6, (25-26)	6-7,14-16,18-19, 25-27,30-1,17-19,23-24,26-28		July 12
1968				
Beaumont	16-19	30-7	18-24	
90%, 13-12	(17-18),(22-23)	1-2	(10-11),15-17, 20-24	
90%, 0-23	7-8,(17-18)	1-2	(12-13),15-16,19-23	July 18
1969				
Beaumont	16-19	29-3,9-14,17-24	1-5,11-21	
90%,13-12		30-2,19-24	2-3,9-10,13-19, 30-31	
90%, 0-23	(17-18)	30-2,18-23	(2-3),12-18,30-31	Aug 5
1970				
Beaumont	21-29	15-19,	22-2,5-16,19-26	
90%, 13-12	11-13,(23-24),27-28	4-7,13-14,17-19 23-24,26-2,7-10,21-24,26-27		
90%, 0-23	11-12,23-24,27-28	4-6,17-18,23-24,26-2,7-10,20-26,29-30		July 28
1971				
Beaumont		23-3	23-2,3-15,22-25,27-31	
90%, 13-12	7-8,19-20,25-26,	29-2,(4-5),23-28,	31-1,9-10,12-14,20-21, 23-25	
90%, 0-23	7-8,(19-21),24-25	29-1,23-28	8-10,12-14,(20-22) 23-25,(28-29)	June 30 & July 14
1972				
Beaumont	19-21,23-27	3-8,11-14	29-2,3-9	
90%, 13-12	24-26	4-5,22-24	30-1,6-7	
90%, 0-23	17-18,24-25	3-4	29-1	July 25

ABERPORTH

	JUNE	JULY	AUGUST	OUTBREAK
1969				
Beaumont	29-3,9-14,18-24		8-19,27-31	
90%, 13-12	17-18	1-3,12-14,20-21, 23-24	Unrecorded	
90%, 0-23	-	1-2,12-13,19-24	Unrecorded	July 28
1970				
Beaumont	10-14	3-7,16-20,25-29,30-3	5-11,19-28	
90%, 13-12	11-13,27-28	4-7,23-24,27-28,31-2	7-11, unrecorded	
90% 0-23	11-13,22-24,27-28	4-7,(17-19),(23-24), 26-28, 31-2	6-8,12-13, unrecorded	August 12
1971				
Beaumont	18-22,24-27	28-6,8-11,13-16,19-22, 26-30	2-5,7-15,18-25	
90%,13-12	19-20	30-2,9-11,23-24,26-29	Unrecorded	
90%, 0-23	(19-20)	30-2,4-5,9-10,23-29(31-1)	3-6,9-10,12-14, 19-24,28-29	?
1972				
Beaumont	16-19,23-27	1-8,12-15,19-30	1-7,19-26	
90%,13-12	24-25	3-4,7-8,13-14, 21-25,28-31	Unrecorded	
90%, 0-23	17-18,24-25	3-4,20-25	28-2,4-6,24-25	?

CARDIFF

	JUNE	JULY	AUGUST	OUTBREAK
1969				
Beaumont		30-3,9-14,18-23	31-3,11-21	
90%, 13-12	-	1-2,11-14,20-21, (28-29)	Unrecorded	
90%, 0-23	-	1-2,10-13,19-21	Unrecorded	?
1970				
Beaumont	21-25,26-28	3-6,11-14,16-19, 22-29	3-11,18-26	
90%, 13-12	30-2,11-13,19-20	4-6,8-9,18-19, 26-29	6-11, unrecorded	
90%, 0-23	1-2,11-12,18-20	4-6,17-19,26-28	(1-2),6-10, unrecorded	August 11
1971				
Beaumont	17-22	29-2	2-5, 9-14,21-24, 27-30	
90%, 13-12	19-20	30-2,27-28,	9-10,13-14,23-24	
90%, 0-23	19-21	29-2,(26-28)	9-10,12-14,23-24, 28-29	August 13
1972				
Beaumont	23-26	30-5,6-9,18-23	-	
90%, 13-12	24-27	3-4,8-9,21-25, 29-31	Unrecorded	
90%, 0-23	24-27	2-3,20-24,28-29, (30-31)	Unrecorded	July 20

PLYMOUTH

	JUNE	JULY	AUGUST	OUTBREAK
1969				
Beaumont	14-18	1-4,18-29,	3-6,7-12,16-20	
90%, 13-12	-	(10-11),13-14,20-21, 26-29	Unrecorded	
90%, 0-23	-	(10-11),19-21,26-28	Unrecorded	July 14
1970				
Beaumont	10-13,16-25,26-28	3-6	21-2,3-15,18-27	
90%, 13-12	11-13,18-19,21-22, 24-25	4-6,8-9,23-24, 26-29	Unrecorded	
90%, 0-23	11-12,17-18,22-24	4-5,7-8,(17-19), 23-24, 26-28	Unrecorded	July 23
1971				
Beaumont	6-11,18-20,	24-1,21-28	31-15,20-24,27-31	
90%, 13-12	19-20,25-26,	29-1,22-24,26-28	Unrecorded	
90%, 0-23	29-30	22—24,26-27	3-5,12-14,22-24, 28-29,(30-31)	?
1972				
Beaumont	20-22,23-27	1-5,6-9,12-14,17-24	30-2,3-10	
90%, 13-12	24-27	3-5,8-9,21-23, (27-28)	Unrecorded	
90%, 0-23	24-27	2-4,7-8,20-22	6-7	?